## REMARKS

Please reconsider this application in view of the amendments and the remarks. Applicant thanks the Examiner for carefully reviewing this application.

**Disposition of the claims**

Claims 1-24 are pending. Claims 1 and 17 are independent. The remaining claims depend, directly or indirectly, from claim 1 or 17.

**Claim amendments**

Claims 1 and 17 have been amended to clarify the inventions recited. Support for these amendments, for example, can be found in paragraphs [0026] and [0029] of the published application No. 2006/0256194. No new matter is introduced by these amendments.

**Claim Rejections under 35 U.S.C. § 103(a)**

*Claims 1-15 and 17-24*

Claims 1-15 and 17-24 are ejected under 35 U.S.C. § 103(a) as being obvious over Gorecki et al. ("New SNOM sensor using optical feedback in a VCSEL-based compound-cavity") in view of Naruse et al. ("Parallel confocal laser microscope system using smart pixel arrays"). Claims 1 and 17 have been amended. To the extent that this rejection may still apply to the amended claims, this rejection is respectfully traversed.

To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be shown or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ (C.C.P.A., 1074).

Embodiments of the present invention relate to a parallel confocal laser microscopy system, which has the light source, the pinhole filter, and the detector aligned on the same axis such that the light traveling to the sample and the signal returning from the sample would travel the same path. This is made possible by using VCSEL as a light source and its beam outlet as the pinhole filter.

With the novel configurations (i.e., sources array, pinhole, and detectors array all packed in one) proposed in the present application, it becomes possible to make a very compact microscope head for *in vivo* applications, for example for use with an endoscope. (paragraph [0014]). These configurations also allow for scanning of the VCSEL/Detector element instead of scanning (moving) a sample. This is important for *in vivo* applications because the living tissues cannot be scanned (moved).

Specifically, independent claim 1 requires, *inter alia*, "an array of vertical-cavity lasers (VCSEL) for emitting light beams, and an optical means comprising at least one lens for focusing the light beams onto an object to be observed, wherein a photodetector is arranged on one face of each VCSEL laser such that the photodetector is capable of receiving a light beam originating from said object via a cavity of the VCSEL laser, the cavity having an opening used as a filtering hole to achieve confocal imaging."

Similarly, claim 17 requires, *inter alia*, "emitting a plurality of light beams from an array of VCSEL vertical cavity lasers; focusing, using an optical means comprising at least one lens, the light beams on an object to be observed; and receiving, by a photodetector arranged on a face of each VCSEL laser, a light beam originating from the object via a cavity of the VCSEL laser, wherein an opening of the cavity is used as a filtering hole for the light beam originating from the object to achieve confocal imaging."

Gorecki et al. discloses a VCSEL cavity used for illuminating a sample in an SNOM configuration. However, SNOM is different from confocal microscopy. It does not focus the excitation light on the object. Instead, it uses a microtip to deliver light to the sample. Illumination trough a microtip aperture does not focus the excitation beam. SNOM microscopy is based on the illumination of a sample at very short distances (several nanometers to several tens of nanometers). At such distances, light exiting from the tip is simply an evanescent field. Such excitation field is definitely not a focused beam.

In a confocal imaging system of the invention, the beam exiting form the VCSEL is focused onto the sample in free space after passing through a lens. The distance covered by the optical beam in our system is in the range of several millimeters and the working distance of our system (between the last optical interface and the focusing point in the sample) is in the range of several tens or hundreds of micrometers. This is clearly very different from SNOM.

One skilled in the art would appreciate that light focusing typically requires a lens. To expedite the prosecution of the application, claims 1 and 17 have been amended to explicitly recite "an optical means comprising at least one lens." One skilled in the art would

not consider the microtip of Gorecki an equivalent of a lens. In addition, claims 1 and 17 have been amended to indicate that the inventions are related to "confocal imaging."

Naruse et al. discloses a parallel confocal microscope that uses different light paths for the excitation beams and the return signals. Pinholes are placed in front of the array of detectors for spatial filtering (giving the confocal capability to the microscope). The approach of Naruse et al. is conventional, as discussed in the present specification and illustrated in Fig. 1. The illuminating and detecting elements are separated in the Naruse architecture.

The SNOM taught in Gorecki is very different from the confocal system taught in Naruse. As noted above, in an SNOM, the excitation beam is conducted by a microtip to within a few nanometers (nM) of the sample, whereas for confocal microscopy, the working distance is typically several micrometers (μM). Furthermore, SNOM does not require light focusing, whereas light focusing is essential for confocal imaging. There is no teaching or suggestion in Gorecki, Naruse, or prior art that would motivate one skilled in the art to combine these two very different technologies. More importantly, a combination of Gorecki and Naruse would not produce the invention as recited in claims 1 and 17, because there is no description of a pinhole entrance on the VCSEL cavity (no pinhole in the case of Gorecki and a separated one for Naruse).

For reasons set forth above, Gorecki et al. and Naruse et al., cannot be properly combined. If combined, Gorecki et al. and Naruse et al. would not teach every limitation of claim 1 and claim 17. Therefore, claims 1 and 17 are patentable over Gorecki et al. in view of Naruse et al. Dependent claims 2-15 and 18-24 should also be patentable for at least the same reasons. Accordingly, withdrawal of this rejection is respectfully requested.

*Claim 16*

Claim 16 is ejected under 35 U.S.C. § 103(a) as being obvious over Gorecki et al. in view of Naruse et al. as applied to claim 15 above, and further in view of Schwarz et al. ("Simple reflection Scanning Near-Field Optical Microscope using the back reflected light inside the laser cavity as detection mode"). Claim 16 depends indirectly from claim 1, which has been amended. To the extent that this rejection may still apply to the amended claims, this rejection is respectfully traversed.

As noted above, Gorecki et al. and Naruse et al. are not properly combinable, and if combined they fail to teach or suggest every limitation of independent claim 1. Schwarz et al. does not provide that which is missing in Gorecki et al. and Naruse et al., as evidenced by the fact that the Examiner relies upon Schwarz et al. for the teaching of endoscope.

Therefore, a combination of Gorecki et al., Naruse et al., and Schwarz et al. cannot render claim 1 obvious. Thus, claim 16, which depends indirectly from claim 1, should be patentable over Gorecki et al. in view of Naruse et al., and further in view of Schwarz et al. for at lease the same reasons. Accordingly, withdrawal of this rejection is respectfully requested.

**Conclusion**

Applicant believes this reply is fully responsive to all outstanding issues and places this application in condition for allowance. If this belief is incorrect, or other issues arise, the Examiner is encouraged to contact the undersigned or his associates at the telephone number listed below. Please apply any charges not covered, or any credits, to Deposit Account 50-0591 (Reference Number 17452/017001).

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Respectfully submitted,

By _____

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